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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/580,809

02/16/2007

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2060.7

6450

29494 7590 03/17/2009
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EXAMINER

QIAN, YUN

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

03/17/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/580,809	Applicant(s) SAKAKIBARA ET AL.	
	Examiner YUN QIAN	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

Claims 1-19 are remained for examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19 are rejected under 35 U.S.C.103 (a) as being unpatentable over Smalley et al. (US 2002/0046872) in view of Kuper et al. (US 7,365,100), in further view of Smalley et al. (2004/0038251).

Regarding claims 1, 3, 8 and 18, Smalley '872 discloses a dielectric material dispersion comprising of polyvinylpyrrolidone (PVP) wrapped SWNTs ([0076]). **Optionally**, the dispersion liquid may further comprise a polymer-based or anionic surfactant ([0046], [0048], and [0064]).

Kuper et al. discloses a composition of suspended non-aggregated carbon nanotubes in organic solvents such as NMP as per applicant claim 1 (Col.11, lines 48-64).

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Smalley and Kuper et al. to obtain the invention as specified in the claim 1, because the choice of solvent is motivated by the facts such as cost, environmental concerns, safety concerns,

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and /or the application for the suspended nanotubes (col. 11, lines 50-53).

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claims 2, 4-5 and 19 as discussed above, although the composition taught by Smalley '872 may further include a polymer-based (nonionic) or an anionic surfactant ([0046], [0048], and [0064]), he does not specifically disclose what kind and how much of a surfactant is applied as per applicant claims 2, 4-5 and 19.

Smalley '251 discloses using anionic and nonionic surfactants for suspending SWNTs in great detail, and teaches the instant claimed nonionic polyoxyethylene surfactant ([0060]). In the given examples 5 and 6, Smalley '251 discloses using about 1%wt of an anionic surfactant SDS. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust an appropriate amount of surfactant based on surfactant and results. Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made

Regarding claims 6- 7, Smalley '872 discloses 1% of PVP used in the invention have a molecular weight 50 KD, which encompasses the instantly claimed (20, 000 to 5,000,000) ([0062]).

Regarding claims 9-10, 12-17, Smalley '872 discloses a method preparation of SWNTs dispersion liquid comprising of mixing nanotubes, NMP and surfactant (such as polyoxyethylene surfactant) with PVP, followed by

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sonication, and filtered through a 1um polycarbonate filter to obtain the fine carbon nanotubes ([0064], [0076]).

Regarding claim 11, the examiner realizes that not all physical properties, i.e. a reduced light scattering, are stated in the references. Since the references teach all of the claimed reagents and conditions, therefore, the reduced light scattering property of the carbon nanotube dispersion liquid would expect to be same as instantly claimed.

Response to Arguments

Applicant's Request for Continue Examination (RCE) filed on February 26, 2009 have been considered.

Regarding claims 1-5, 8, 10-12, 14, 16, and 18- 19 rejected under 35 U.S.C.103 (a) as unpatentable over Glatkowski et al. (US 2003/0122111) in view of Zhang et al. (US 2005/0025694), the Applicant argues that the prior art reference or combination of references do not teach or suggest all of the limitations of the claims.

Regarding claim 1, Glatkowski et al. states that the SWNTs dispersion may also contain surfactants, so the surfactant is optional ([0061] and claim 23). As such, the rejection stands.

Regarding independent claims 2 as set forth in the final office action, both Glatkowski et al. and Zhang et al. teach compositions containing carbon nanotubes and methods of making of carbon nanotube dispersions in liquids (Titles and Abstracts).

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As discussed above (Smalley '251), the surfactants including an anionic and a nonionic both are widely applied in the SWNTs dispersion liquid. Therefore it teaches or suggests the possibility of substituting an anionic surfactant with a nonionic surfactant.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute sodium dodecyl sulfate (SDS) of Glatkowski and with Zhang's polyoxyethylene surfactant. Because it not only can contain more carbon nanotubes used for producing the electrically conductive film, it generates a uniformly and stable carbon nanotube dispersion in liquid. Because both teach are well recognized compositions, and would have a reasonable expectation of success. Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

For the same reason, rejections for the dependant claims 3--5, 8, 10-12, 14, 16 and 18-19 stand.

Regarding claim 12, as set forth in the final office action filed on January 7, 2009, the Examiner respectfully submits that the preparation method taught either by Glatkowski et al or Smalley '872 as evidenced by Chem. Phys. Lett. 303 (1999) 125 to Liu et al. comprises the steps of mixing and dispersing SWNTs in NMP/PVP under sonication, so it meets the criteria of the instantly claimed ([0064], [0088], and [0131]). Therefore, the rejection stands.

Claims 1, 3-5, 6-10, 12-13, 14-17 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Smalley et al. (US 2002/0046872) in view of Zhang et

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al. (US 2005/0025694), the Applicant argues that Smalley '872 does not teach nonionic surfactant.

As discussed above, the composition taught by Smalley '872 may further include a polymer or an anionic surfactant ([0046], [0048], and [0064]). It is an option of the Examiner to interpret the polymer surfactant comprising a nonionic polyoxyethylene surfactant as per applicant claims, especially evidenced by Smalley '251 as discussed above. As such, the rejection stands.

Conclusion

Regarding claims 1-5, 8, 10-12, 14, 16, and 18-19 rejected under 35 U.S.C.103 (a) as unpatentable over Glatkowski et al. (US 2003/0122111) in view of Zhang et al. (US 2005/0025694), the rejections stand.

Claims 1, 3-5, 6-10, 12-13, 14-17 are rejected under 35 U.S.C.103 (a) as being unpatentable over Smalley et al. (US 2002/0046872) in view of Zhang et al. (US 2005/0025694), the rejections stand.

New ground rejections respect to claims 1-19 over Smalley et al. (US 2002/0046872) in view of Smalley et al. (2004/0038251) are filed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUN QIAN whose telephone number is (571)270-5834. The examiner can normally be reached on Monday-Thursday, 10:00am -4:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENZO/
Supervisory Patent Examiner, Art Unit 1793

/YUN QIAN/
Examiner, Art Unit 1793